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(54) Method and apparatus for detecting an empty gas compartment in a patient ventilator

(57) An apparatus/method for detecting an empty breathing gas compartment (27) condition in a bellows ventilator for a patient. The apparatus includes a first sensor (10) for measuring, during inspiration, the incoming flow of gas into a driving gas compartment (26) located in the bellows container (13). The second sensor (11) measures the pressure in the driving gas compartment (26). During the inspiration cycle, measurements taken by the first and second sensors (10,11) are sig-

naled to a control unit (3) and used to determine a $\Delta V/\Delta p$ compliance value. The compliance value will be large if the bellows (14) is movable, i.e. not in the empty breathing compartment gas condition. The compliance value is small if the empty breathing gas compartment condition exists. The compliance value, so determined, is compared with a reference compliance value in the control unit to detect the empty breathing gas compartment condition.

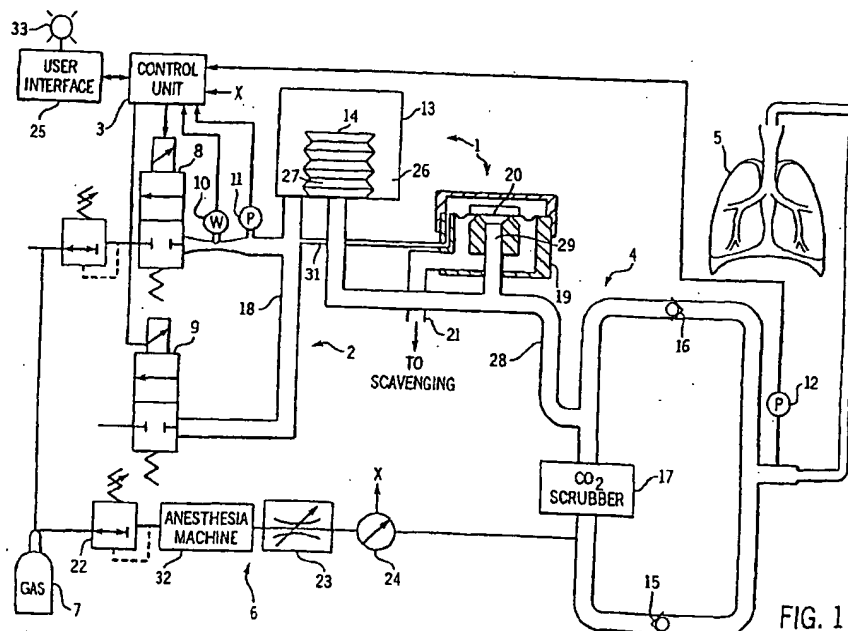


FIG. 1

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 99 30 6804

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5662099	A	02-09-1997	NONE	
GB 2321599	A	05-08-1998	NONE	
GB 2054387	A	18-02-1981	SE 418456 B	09-06-1981
			DE 3023095 A	08-01-1981
			FR 2459053 A	09-01-1981
			JP 56005667 A	21-01-1981
			SE 7905509 A	22-12-1980
EP 0046570	A	03-03-1982	JP 1271300 C	25-06-1985
			JP 57043751 A	11-03-1982
			JP 59048106 B	24-11-1984
			DE 3171395 D	22-08-1985
			US 4444201 A	24-04-1984

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